Pregnancy and glomerulonephritis

By

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Focus of the Talk

- Renal adaptations to normal pregnancy
- Pregnancy outcomes in CKD
- Pregnancy and GN:
  - Difficulties in management
  - Effect of GN on pregnancy outcomes
  - IgA nephropathy
  - Vasculitis
  - Lupus nephritis

- **Renal adaptations to normal pregnancy**
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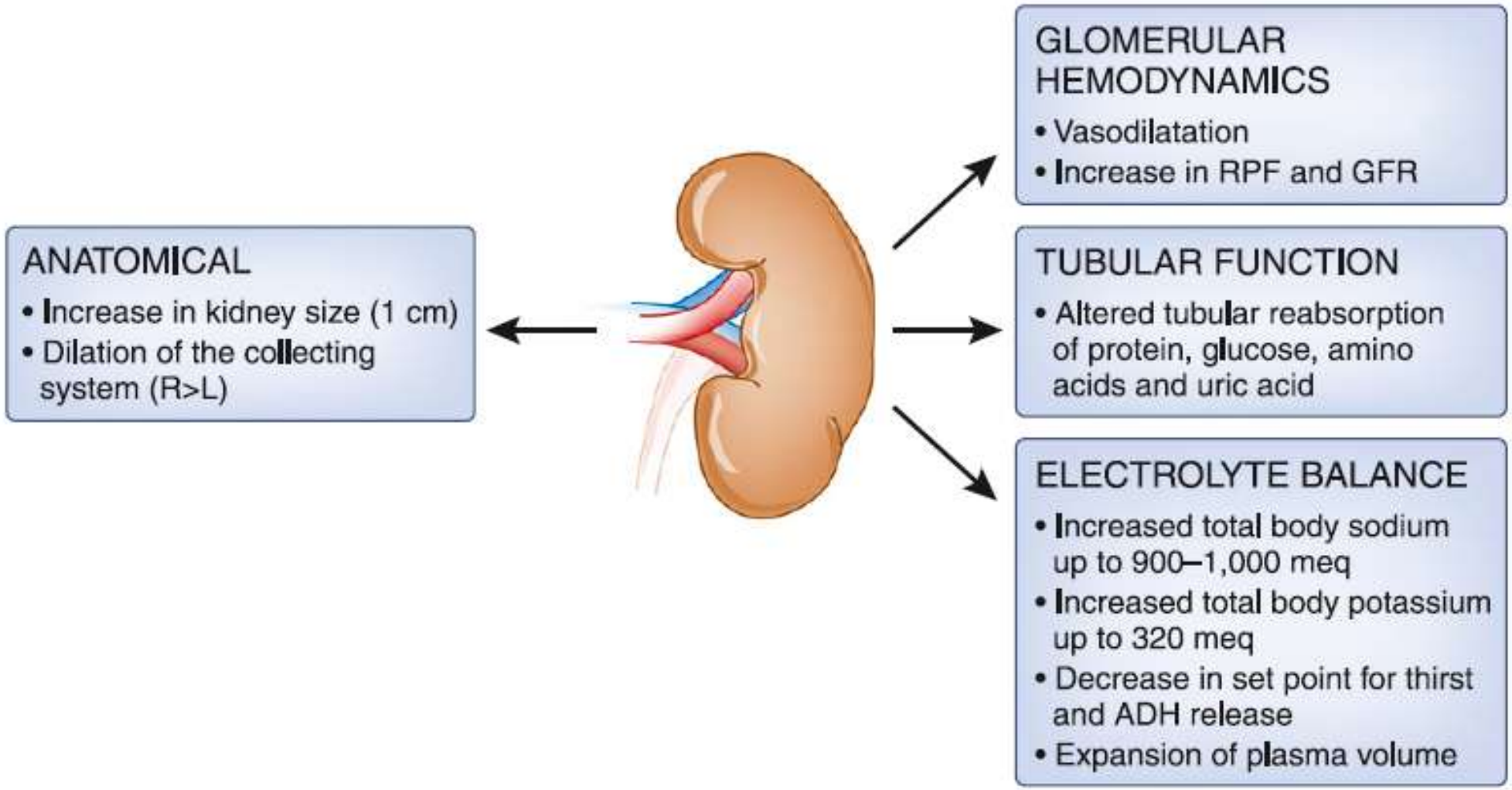
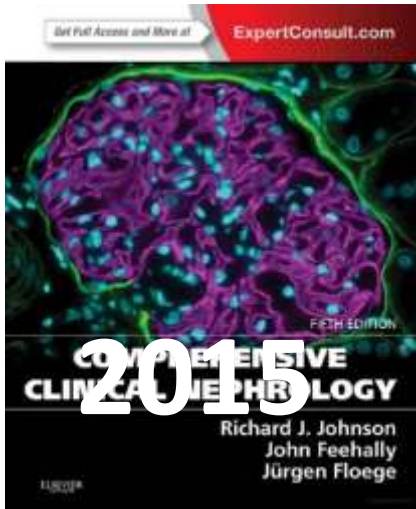
Renal adaptations to normal pregnancy



Clin J Am Soc Nephrol 7: 2073–2080, 2012

Common Indices During Pregnancy

	Nonpregnant	Pregnant
Hematocrit (%)	41	33
Serum protein (g/dl)	7.0	6.0
Plasma osmolality (mOsm/kg)	285	275
Serum sodium (mmol/l)	140	135
Serum creatinine (mg/dl, μmol/l)	0.8 (73)	0.5 (45)
Blood urea nitrogen (mg/dl)	12.7	9.3
Serum urea (mmol/l)	4.5	3.3
pH units	7.40	7.44
Arterial P_{CO_2} (mm Hg)	40	30
Serum bicarbonate (mmol/l)	25	20
Serum uric acid (mg/dl, μmol/l)	4.0 (240)	3.2 (190) early 4.3 (260) late
Systolic BP (mm Hg)	115	105
Diastolic BP (mm Hg)	70	60



Assessment of renal functions

- Serum creatinine > 1 mg/dl in a pregnant woman indicates reduced GFR.
- The MDRD or CKD-EPI equations or other formulas are not valid for pregnancy.
- Measurement of creatinine clearance by 24 hours urine collection is the only clinical way of truly assessing GFR in pregnancy
- Proteinuria = PC > 30 mg/mmol or > 300 mg/day proteinuria

BJOG 2008; 115:109–112

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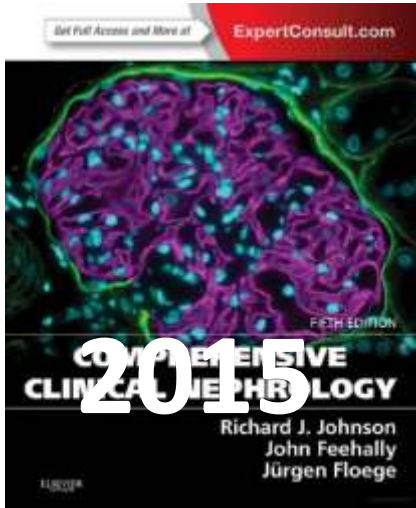
CHRONIC KIDNEY DISEASE: ADVERSE EFFECTS ON PREGNANCY

- The key pre-pregnancy factors predicting outcome include the following:
  - Degree of renal impairment
  - Control of hypertension
  - Degree of proteinuria



Maternal Renal Outcomes According to Pre-pregnancy Serum Creatinine

Creatinine <1.5 mg/dl (130 µmol/l)

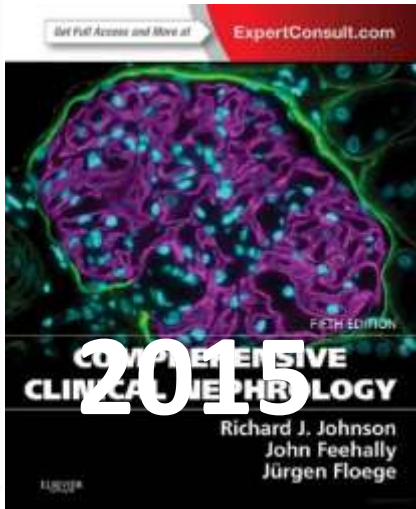
- Permanent loss of GFR in <10% of women
- Greatest risk if GFR <40 ml/min and proteinuria >1 g/day
- Major determinant of ESRD progression is hypertension
- 40% risk of preeclampsia if baseline proteinuria >500 mg/day

Creatinine 1.5-2.5 mg/dl (130-220 µmol/l)

- Decline or permanent loss of GFR in 30% of women
- Increased to 50% if uncontrolled hypertension
- 10% ESRD soon after pregnancy

Creatinine >2.5 mg/dl (220 µmol/l)

- Progression to ESRD highly likely during or soon after pregnancy



Fetal Outcomes According to Maternal Pre-pregnancy Serum Creatinine

Outcomes after accounting for first-trimester miscarriage:

Creatinine <1.5 mg/dl (130 µmol/l)

Live births in >90% of women

Up to 50% preterm delivery, 60% small for gestational age if baseline proteinuria >500 mg/day

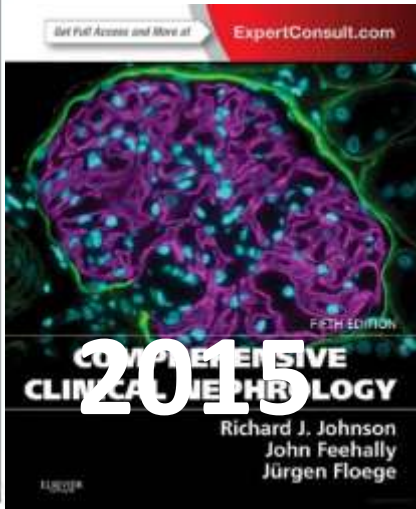
Creatinine 1.5-2.5 mg/dl (130-220 µmol/l)

Live births in about 85% of women unless uncontrolled hypertension (MAP >105) at conception

60% prematurity, mainly iatrogenic (preeclampsia/fetal growth restriction)

Creatinine >2.5 mg/dl (220 µmol/l)

Fetal loss high; estimates uncertain



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1. Distinguishing preeclampsia from other kidney diseases

Clinical Features	Preeclampsia	Kidney Disease
Timing in pregnancy	After 20 weeks gestation	Any gestational age
Leucopenia or thrombocytopenia	Absent	May be present
Active urine sediment	Absent	May be present
Other organ involvement	Absent	May be present
Autoantibodies	Absent	May be present
Hypertension	Present	Often present
Elevated serum creatinine	Typically absent	Commonly present

Advances in chronic kidney disease 2013; 20(5):402-410

2. Performing a kidney biopsy

Before 32 weeks

- New-onset lupus nephritis.
- Any unexplained deterioration of kidney function.
- Massive proteinuria

Clin J Am Soc Nephrol 8: 1027–1033, 2013

Nephrol Dial Transplant (2008) 23: 201–206
doi:10.1093/ndt/gfm572
Advance Access publication 25 August 2007

NDT
Nephrology Dialysis Transplantation

Original Article

The role of renal biopsy in women with kidney disease identified in pregnancy

Clara Day[1], Peter Hewins[1], Sarah Hildebrand[1], Lumaan Sheikh[2], Gabrielle Taylor[1], Mark Kilby[2] and Graham Lipkin[1]

20 women presenting with renal disease of a severity to warrant renal biopsy during pregnancy

- One patient had minor post-biopsy hematuria which settled spontaneously.

- Nine of the 20 patients had an immediate change in therapy (mainly the initiation or increase in dose of immunosuppressive medication) as a consequence of knowledge of renal histology.

3. Safety of immunosuppressive medications

Drug Name	Comments	FDA Class[a]	Breastfeeding[b]
Corticosteroids	Risks of use often outweighed by risk of underlying disease. Potential risks for orofacial clefts (3 of 1000 births) and premature birth	C	Usually compatible
Hydroxychloroquine	Considered safe in pregnancy at 200–400 mg/d. Discontinuation during pregnancy associated with increased risk of lupus flare. May use for maintenance or mild flares	Not assigned	Usually compatible
NSAID	Avoidance after 28 weeks of gestation because of the effects of NSAID-related prostaglandin inhibition on the fetal cardiovascular system (closure of ductus arteriosus)	C	Usually compatible
Cyclosporine	Can be maintained in pregnancy at lowest effective dose. No significant increase in rate of congenital malformations	C	Not recommended
Tacrolimus	Can be maintained in pregnancy at lowest effective dose. Potential risks of neonatal hyperkalemia and renal dysfunction	C	Not recommended
Rituximab	Limited safety data. May alter fetal and neonatal B cell development	C	Not recommended
IVIG (γ globulin)	Data are lacking, but may be helpful for lupus nephritis flare refractory to medical therapy	C	Compatible
Azathioprine	May use for flare during pregnancy. Consider as alternative to mycophenolate. Avoid doses >1.5–2 mg/kg per day due to risk of suppressed neonatal hematopoiesis	D	Not recommended
Mycophenolate mofetil	Contraindicated during pregnancy due to teratogenicity	D	Not recommended
Cyclophosphamide	Useful when maternal disease is life threatening. High risk of fetal loss, but less pronounced in more recent studies	D	Not recommended
Methotrexate	High risk of miscarriage and congenital abnormality. Treatment should be withdrawn 3 months before pregnancy	X	Not recommended

Clin J Am Soc Nephrol 7: 2089–2099, 2012

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Influence of pregnancy on the course of primary GN

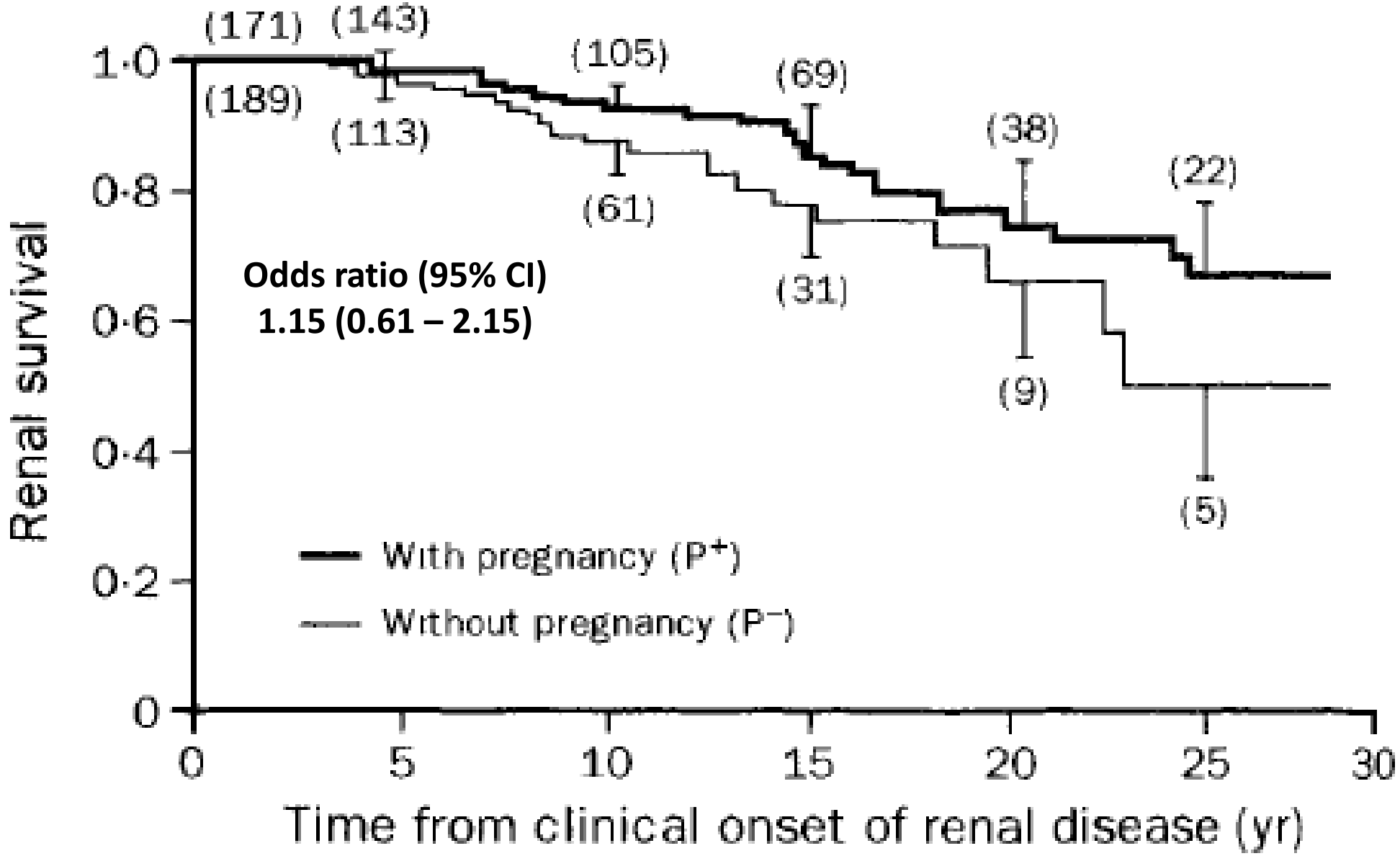
THE LANCET

Influence of pregnancy on the course of primary chronic glomerulonephritis

Paul Jungers, Pascal Houillier, Dominique Forget, Mathilde Labrunie, Habib Skhiri, Ioannis Giatras, Béatrice Descamps-Latscha

- Case control study
- 360 patients: 171 get pregnant and 189 did not conceive.
- Various histological forms of primary GN
- Normal renal function at presentation

Lancet 1995; 346: 1122-24



Lancet 1995; 346: 1122-24

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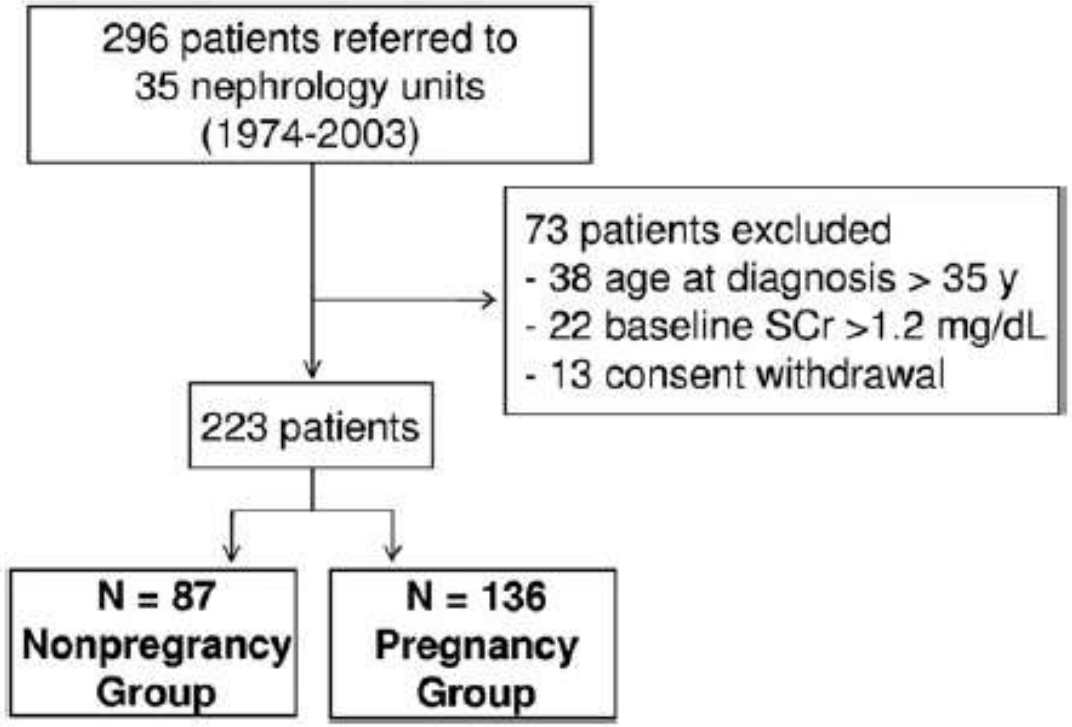
IgA nephropathy

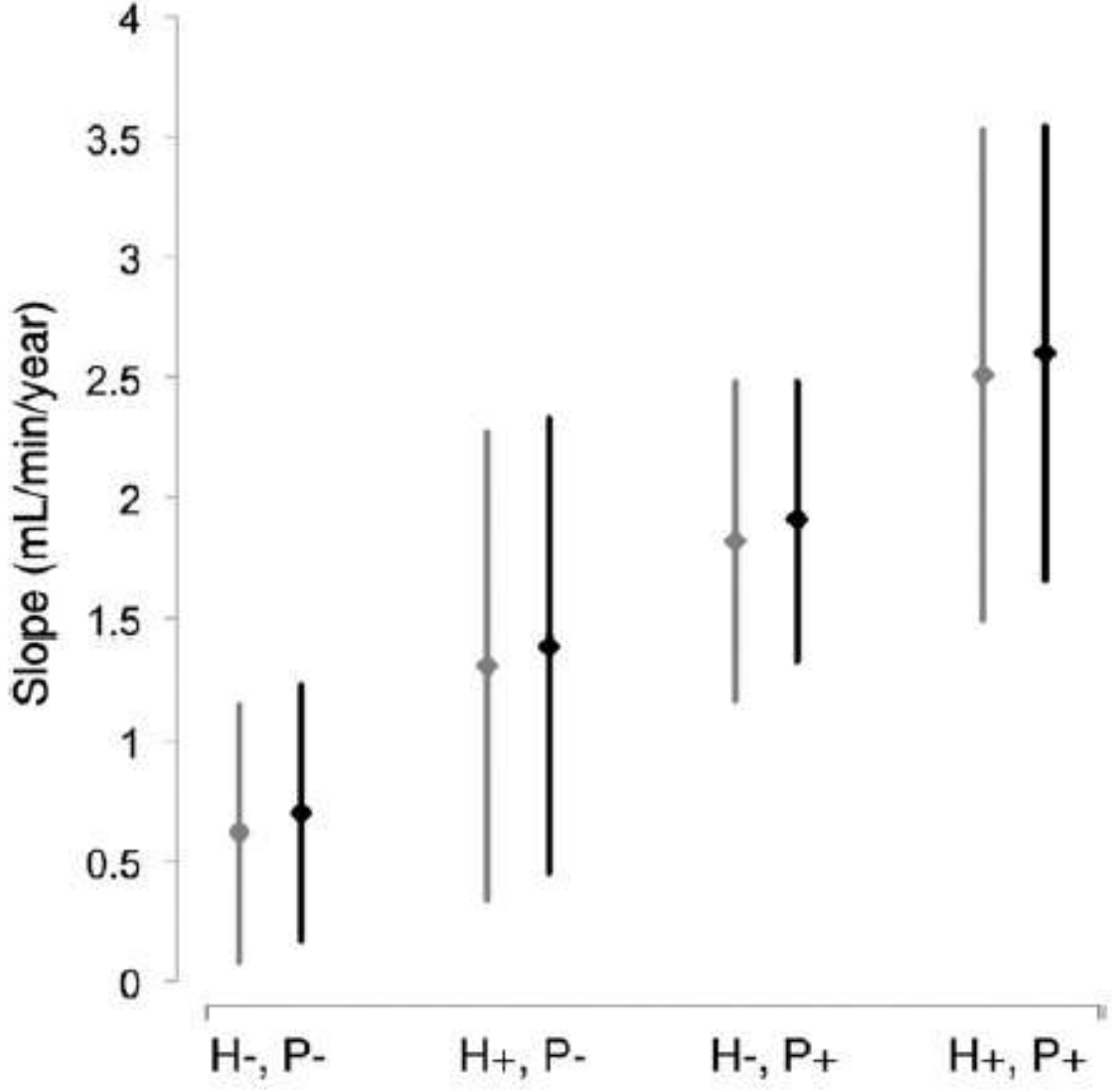
Pregnancy and Progression of IgA Nephropathy: Results of an Italian Multicenter Study

Monica Limardo, MD,[1] Enrico Imbasciati, MD,[2]* Pietro Ravani, PhD, MD,[3]* Maurizio Surian, MD,[4] Diletta Torres, MD,[5] Gina Gregorini, MD,[6] Riccardo Magistroni, MD,[7] Daniela Casellato, MD,[8] Linda Gammaro, MD,[9] and Claudio Pozzi, MD,[10] on behalf of the "Rene e Gravidanza" Collaborative Group of the Italian Society of Nephrology*



Am J Kidney Dis 2010; 56:506-512

Average creatinine clearance decrease (mL/min/y)



Am J Kidney Dis 2010; 56:506-512

Predictors of bad outcome

- GFR < 70 mL/minute/1.73 m^2
- Heavy proteinuria
- Uncontrolled hypertension
- Severe arteriolar and tubulointerstitial disease on kidney biopsy

Advances in chronic kidney disease 2013; 20(5):402-410

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Vasculitis

- Predominantly affect men or women after childbearing age
- Infrequently encountered during pregnancy
- Difficulty in management due to toxicity of the immunosupressive medications to both the fetus and the mother

36 reported cases since 1970

	No. of pregnancies	Pregnancy outcome						
		Term delivery	Preterm delivery	Cesarean section	Spont. abortion	Ther. abortion	Maternal death	Relapse/ flare-up
Disease activity at the onset of pregnancy								
No disease (diagnosis during pregnancy)	11 (13–23)	2	5	4		2	1	
In remission	21 (2, 3, 7–9, 11, 12, 24–31),[pc]	14	6	9		1		8
Active disease	4 (10, 25, 26, 32)				2	2	1	3
Initial treatment								
No disease (diagnosis during pregnancy)	10[a]							
CY-CS	5 (13, 15, 17, 19, 20)	1	3	2		1		
CS-AZA	1 (11)						1	
CS-IVIG	1 (22)		1					
CY-CS-TS	1 (18)					1		
No treatment	2 (21, 23)	1						
In remission	17[b]							
CS	5 (7, 12)	2	2	3		1		
CS-AZA	2 (24),[pc]	1	1	1				1
CS-IVIG	1 (9)	1						
AZA	2 (8, 11)	1	1	2				1
CS-CP	1 (28)		1	1				
No treatment	6 (7, 25, 26, 29, 31)	5	1	1				
Active disease	4							
CS	2 (10, 32)				1	1	1	2
CY-CS	1 (25)				1			1
CY-CS-AZA-TS	1 (26)				1			

Fertility and sterility 2008; 89(2):e451-457.

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LN and pregnancy

- Risk factors of SLE flares
- Pregnancy outcome
- Differentiation of pre-eclampsia and active LN
- Immunosuppressive drugs
- Positive antiphospholipid antibody
- Follow up
- Management
- Contraception

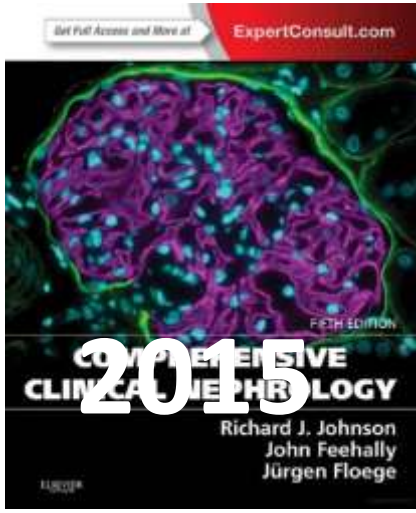
Lupus Nephritis

- Lupus nephritis (LN) is among the most variable and most dangerous renal diseases affecting pregnant women.
- The rule of renal failure not progressing when serum creatinine is ≤1.4 mg/dl does not apply to women with lupus.
- Increased risk of LN flare during pregnancy
- Renal biopsy is avoided after 32 weeks of gestation

Advances in chronic kidney disease 2013; 20(3):223-228

Pregnancy is safest if :

- Remission with the patient receiving < 20 mg daily of prednisone with or without azathioprine for 6 months
- Serum creatinine ≤ 1.4 mg/dl
- Proteinuria < 0.5 gm/day
- BP is well controlled



All patients should receive aspirin and hydroxychloroquine

- **Risk factors of SLE flares**
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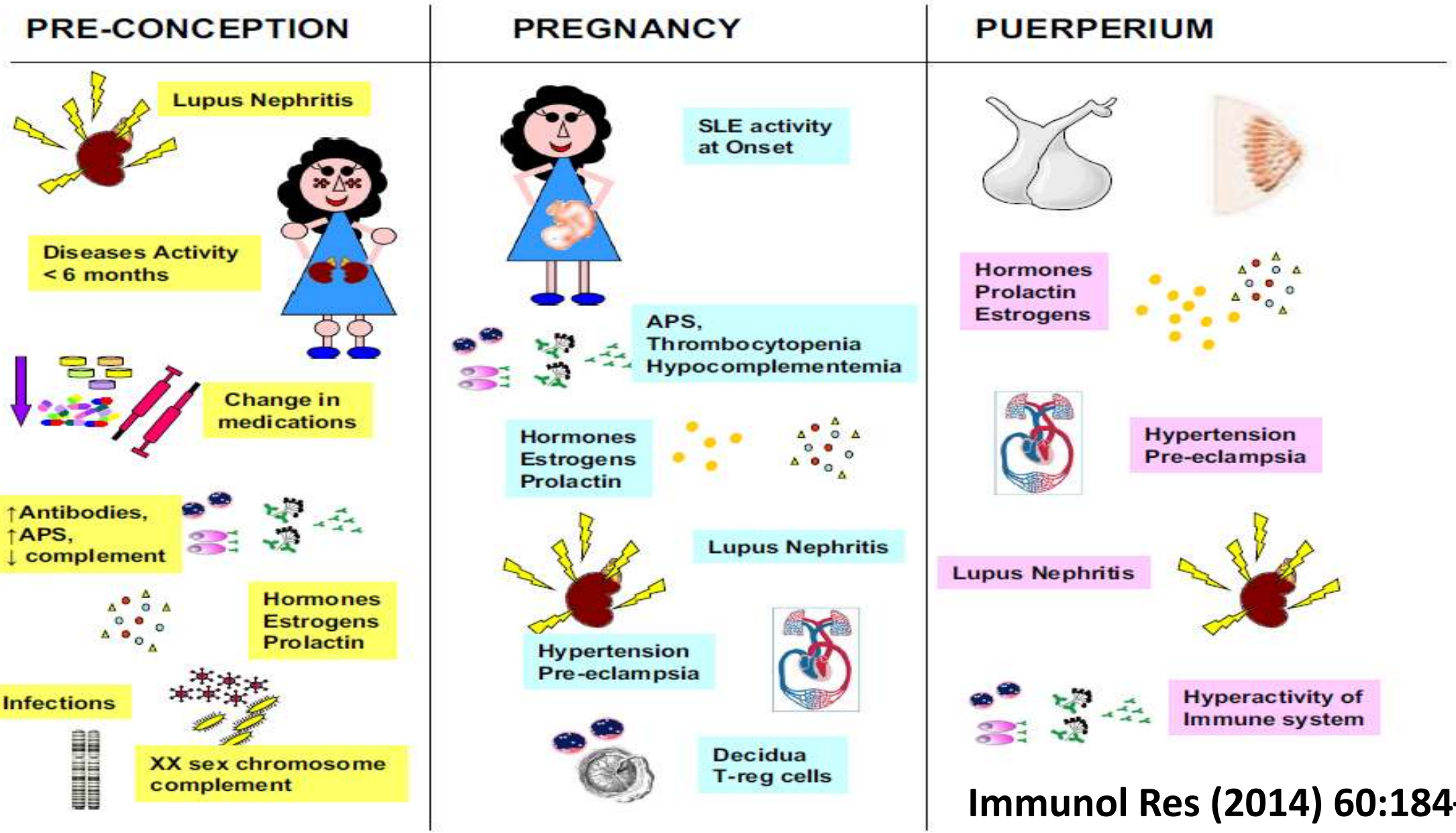
Risk factors of SLE flares during pregnancy



Immunol Res (2014) 60:184–192

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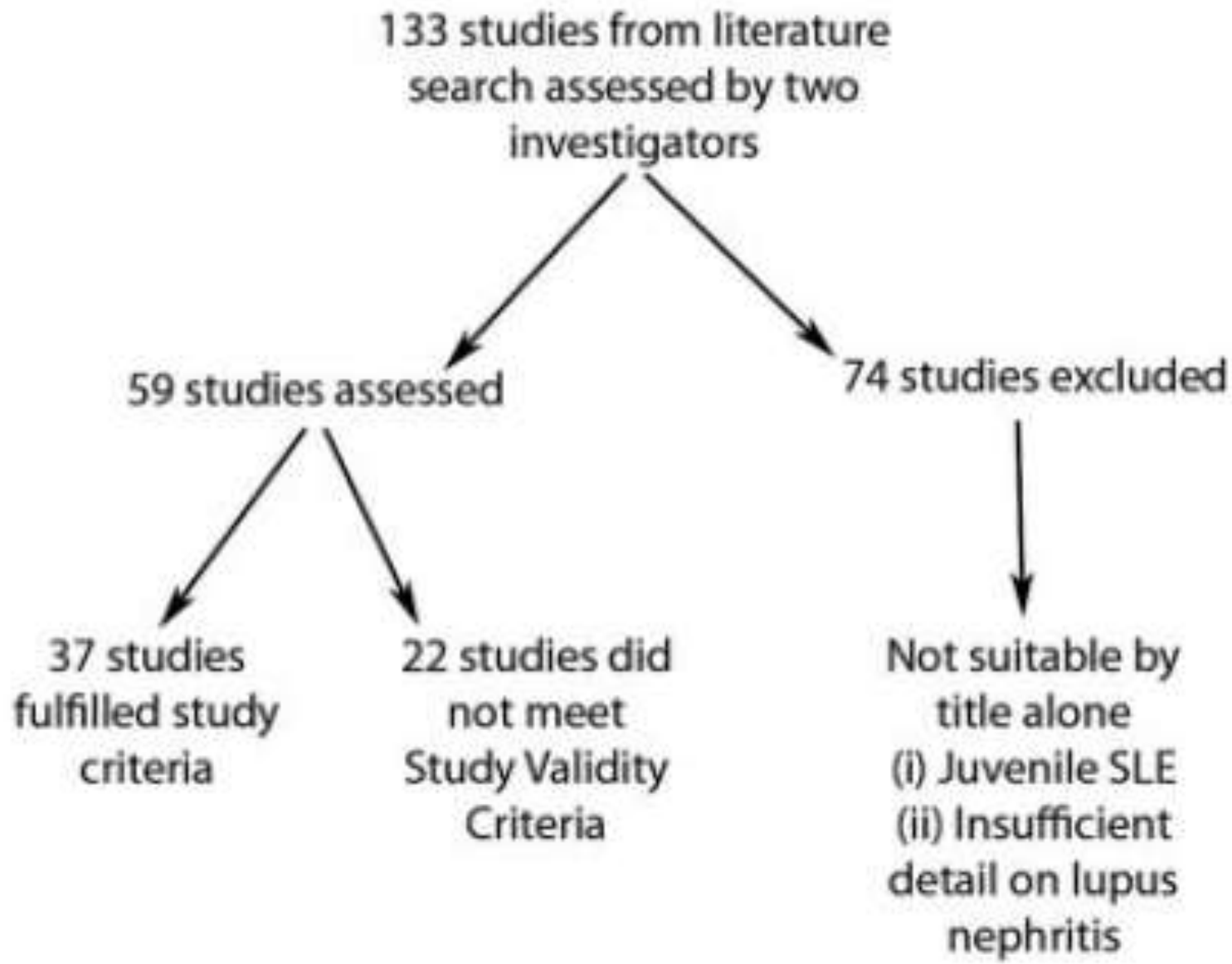
LN and pregnancy outcome

CJASN ePress. Published on August 5, 2010 as doi: 10.2215/CJN.00240110

A Systematic Review and Meta-Analysis of Pregnancy Outcomes in Patients with Systemic Lupus Erythematosus and Lupus Nephritis

Andrew Smyth,* Guilherme H.M. Oliveira,† Brian D. Lahr,‡ Kent R. Bailey,‡ Suzanne M. Norby,§‖ and Vesna D. Garovic§‖

**Department of Medicine, National University of Ireland, Galway, Ireland; §Department of Medicine, ‡Division of Biomedical Statistics and Informatics, and ‖Division of Nephrology and Hypertension, Mayo Clinic, Rochester, Minnesota; and †Department of Cardiology, University of Texas M. D. Anderson Cancer Center, Houston, Texas*



Electronic databases from 1980 to 2009

1842 patients and 2751 pregnancies

Fetal events

Event	Fixed-Effects Analysis	
	Test for Heterogeneity	Estimated Rate (95% CI)
Induced abortions	<0.001	7.2% (6.0%, 8.4%)
Spontaneous abortions	<0.001	16.6% (14.7%, 18.5%)
Stillbirths	0.001	4.0% (2.9%, 5.1%)
Neonatal deaths	0.050	2.8% (1.9%, 3.8%)
Unsuccessful pregnancies	0.025	23.0% (20.3%, 25.6%)
Intra Uterine Growth Retardation (IUGR)	<0.001	14.3% (12.4%, 16.2%)
Premature Birth Rate	<0.001	37.1% (34.8%, 39.4%)

CJASN ePress. Published on August 5, 2010

Maternal events

Event	Fixed-Effects Analysis	
	Test for Heterogeneity	Estimated Rate (95% CI)
Maternal death[b]	<0.001	2.1% (1.3%, 3.0%)
Stroke[b]	1.00	0.8% (0.0%, 1.5%)
Hypertension	<0.001	15.3% (13.3%, 17.3%)
Pre-eclampsia	<0.001	9.1% (7.4%, 10.8%)
Eclampsia	0.184	0.8% (0.0%, 1.6%)
Active nephritis	<0.001	19.0% (17.4%, 20.6%)
Flares	<0.001	29.2% (27.3%, 31.0%)

CJASN ePress. Published on August 5, 2010

LN and adverse pregnancy outcomes

Y-Variable	Meta-Regression (X)			
	Active Nephritis		History of Nephritis	
	Estimate (95% CI)	P	Estimate (95% CI)	P
Induced abortion rate	0.0508 (−0.0863, 0.1878)	0.412	0.0480 (−0.0426, 0.1385)	0.269
Spontaneous abortions	0.0604 (−0.1352, 0.2560)	0.507	0.0324 (−0.0772, 0.1420)	0.540
Stillbirths	0.0193 (−0.0510, 0.0896)	0.544	−0.0183 (−0.0754, 0.0387)	0.506
Neonatal death rate	0.0496 (−0.0296, 0.1289)	0.163	0.0312 (−0.0091, 0.0715)	0.136
Unsuccessful pregnancy	0.0502 (−0.1706, 0.2709)	0.622	0.0041 (−0.1200, 0.1282)	0.943
IUGR rate	−0.0855 (−0.3115, 0.1405)	0.457	−0.087 (−0.1450, 0.1277)	0.892
Premature birth rate	0.4261 (0.0627, 0.7896)	0.020	0.1717 (−0.0462, 0.3896)	0.111
Hypertension rate	0.5379 (0.2647, 0.8112)	<0.001	0.2931 (0.1763, 0.4009)	<0.001
Preeclampsia	0.1055 (−0.1237, 0.3348)	0.328	0.1352 (0.0176, 0.2528)	0.017
Eclampsia	0.0174 (−0.0423, 0.0772)	0.252	0.0174 (−0.0423, 0.0772)	0.252

CJASN ePress. Published on August 5, 2010

Int Urol Nephrol (2015) 47:1379–1385
DOI 10.1007/s11255-015-1032-y

NEPHROLOGY - ORIGINAL PAPER

Clinical outcomes and predictors of fetal and maternal consequences of pregnancy in lupus nephritis patients

Jiaxuan Lv[1] · Wei Wang[1] · Yuehong Li[1]

52 SLE patients:
LN (*n* = 24)
Non-LN (*n* = 28)

Lupus activity during pregnancy

Lupus activity indicators	Total ($N = 52$)	LN ($N = 24$)	Non-LN ($N = 28$)	P value
LAI-P	0.50 ± 0.50	0.83 ± 0.38*	0.21 ± 0.42	0.001
Increase index of LAI-P	0.42 ± 0.38	0.65 ± 0.36*	0.21 ± 0.27	0.001
Hypertension	12 (23.1 %)	10 (41.7 %)*	2 (7.1 %)	0.003
Preeclampsia	6 (11.5 %)	5 (20.8 %)*	1 (3.8 %)	0.013
Lupus flares	26 (50 %)	20 (83.3 %)*	6 (21.4 %)	0.001
Cutaneous lesion	6 (11.5 %)	13 (54.2 %)	10 (35.7 %)	0.182
Articular lesion	5 (9.6 %)	3 (12.5 %)	2 (7.1 %)	0.856
Hemato logical abnormal	9 (17.3 %)	5 (20.8 %)	4 (14.3 %)	0.799
Neuropsychi-atries	3 (5.8 %)	2 (8.3 %)	1 (3.6 %)	0.891
Renal damage	24 (46.2 %)	24 (100 %)*	0	0.0
Low comple-ment 3 (%)	22 (42.3 %)	14 (58.3 %)*	8 (28.6 %)	0.030
Low comple-ment 4 (%)	24 (46.2 %)	16 (66.7 %)*	8 (28.6 %)	0.006
Hypoalbu minemia	28 (53.8 %)	20 (83.3 %)*	9 (32.1 %)	0.001

Int Urol Nephrol (2015) 47:1379–1385

Fetal outcomes

Fetal outcomes	Total ($N = 52$)	LN ($N = 24$)	Non-LN ($N = 28$)	P value
Gestational age (weeks)	37.1 ± 1.9	36.4 ± 2.0*	37.5 ± 1.7	0.041
Birth weight (g)	2797.7 ± 600.4	2548.2 ± 540.8*	2949.1 ± 592.6	0.028
Small for gestational age (SGA)	12 (23.1 %)	8 (33.3 %)*	4 (14.3 %)	0.002
Live birth pregnancies	45 (86.5 %)	17 (70.8 %)*	28 (100 %)	0.001
Unsuccessful pregnancies	7 (13.5 %)	7 (29.2 %)*	0 (0 %)	0.001
Gender (male)	21 (46.7 %)	6 (35.3 %)	15 (53.6 %)	0.233
Height (cm)	48.0 ± 3.7	47.1 ± 3.0	48.6 ± 3.9	0.140
Apgar score	9.8 ± 0.6	9.8 ± 0.7	9.9 ± 0.6	0.630

Int Urol Nephrol (2015) 47:1379–1385

Predictors of adverse fetal outcomes

Predictors	OR	95 % CI	*P* value
Increased LAI-P	4.20	1.2–14.5	0.020
Renal damage	8.40	2.2–31.8	0.001
Hypocomplementemia	3.23	1.0–10.7	0.050
Hypoalbuminemia	5.63	1.4–23.0	0.011
Hypertension	6.00	1.5–24.2	0.021

Int Urol Nephrol (2015) 47:1379–1385

LN class as a determinant of pregnancy outcome

AJRI 2005; 53: 182–188

American Journal of Reproductive Immunology

Class III–IV Proliferative Lupus Nephritis and Pregnancy: A Study of 42 Cases

3 groups:

Group 1 (*n* = 32) class III or IV lupus nephritis

Group 2 (*n* = 9) class II or V lupus nephritis

Group 3 (*n* = 43) SLE with no LN

Outcome of Pregnancy

Pregnancy outcome	Group 1 ($n = 42$)	Group 2 ($n = 12$)	Group 3 ($n = 54$)	*P*-value
Elective abortion (%)	4 (9.5)	1 (8.3)	2 (3)	NS
Spontaneous abortion (%)	6 (14.2)	2 (16.6)	9 (16.6)	NS
Viable pregnancy (%)	32 (76.1)	9 (75)	43 (79.6)	NS
Fetal loss	1	0	0	
Live birth	31	9	43	

AJRI 2005; 53: 182–188

Obstetrical and Medical Complications

	Group 1 ($n = 32$)	Group 2 ($n = 9$)	Group 3 ($n = 43$)	*P*-value
Hypertension (%)	12 (37.5)	1 (11.1)	5 (11.6)	0.01
Preeclampsia (%)	9 (28.1)	0	2 (4.6)	0.005
Gestational age (weeks)	35.6 ± 2.6	36.8 ± 3.3	37.2 ± 4.2	NS
Preterm delivery (%)	10 (34.6)	3 (26.6)	8 (18.6)	NS
Cesarean (%)	14 (43.7)	3 (33.3)	8 (18.6)	0.06
Birthweight (g)	2214 ± 802	2783 ± 721	2870 ± 835	0.02
Flare* (%)	8 (19)	4 (33.3)	15 (27.7)	NS
Renal flare	4	1	0	

AJRI 2005; 53: 182–188

- Risk factors of SLE flares
- Pregnancy outcome
- **Differentiation of pre-eclampsia and active LN**
- Immunosuppressive drugs
- Positive antiphospholipid antibody
- Follow up
- Management
- Contraception

Differentiation of pre-eclampsia and active LN

	Pre-Eclampsia	Active Lupus Nephritis
Timing in pregnancy	After 20 wk of gestation	All gestational ages
Complement (C3, C4)	Normal	Typically decreased
Thrombocytopenia	Absent	Present
Neutropenia	Absent	Present
Active urine sediment	Absent	Present (may be benign in membranous lupus nephritis)
Other organ involvement	Absent	Present
Anti-double-stranded DNA antibodies	Absent	Present
Anti-C1q antibodies	Normal	May be high
Abnormal liver function tests	Absent	Absent
Serum uric acid	Increased	Normal (may be elevated with reduced GFR)
Hypertension (BP >140/90 mmHg)	Present	Variable
Elevation in creatinine (>1.2 mg/dl)	Typically absent	Commonly present

Clin J Am Soc Nephrol 7: 2089–2099, 2012

- Risk factors of SLE flares
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Anti-inflammatory and immunosuppressive drugs in pregnancy

Drug Name	Comments	FDA Class[a]	Breastfeeding[b]
Corticosteroids	Risks of use often outweighed by risk of underlying disease. Potential risks for orofacial clefts (3 of 1000 births) and premature birth	C	Usually compatible
Hydroxychloroquine	Considered safe in pregnancy at 200–400 mg/d. Discontinuation during pregnancy associated with increased risk of lupus flare. May use for maintenance or mild flares	Not assigned	Usually compatible
NSAID	Avoidance after 28 weeks of gestation because of the effects of NSAID-related prostaglandin inhibition on the fetal cardiovascular system (closure of ductus arteriosus)	C	Usually compatible
Cyclosporine	Can be maintained in pregnancy at lowest effective dose. No significant increase in rate of congenital malformations	C	Not recommended
Tacrolimus	Can be maintained in pregnancy at lowest effective dose. Potential risks of neonatal hyperkalemia and renal dysfunction	C	Not recommended
Rituximab	Limited safety data. May alter fetal and neonatal B cell development	C	Not recommended
IVIG (γ globulin)	Data are lacking, but may be helpful for lupus nephritis flare refractory to medical therapy	C	Compatible
Azathioprine	May use for flare during pregnancy. Consider as alternative to mycophenolate. Avoid doses >1.5–2 mg/kg per day due to risk of suppressed neonatal hematopoiesis	D	Not recommended
Mycophenolate mofetil	Contraindicated during pregnancy due to teratogenicity	D	Not recommended
Cyclophosphamide	Useful when maternal disease is life threatening. High risk of fetal loss, but less pronounced in more recent studies	D	Not recommended
Methotrexate	High risk of miscarriage and congenital abnormality. Treatment should be withdrawn 3 months before pregnancy	X	Not recommended

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Hydroxychloroquine

Lupus (2015) 24, 210–217
http://lup.sagepub.com

LUPUS AROUND THE WORLD

Hydroxychloroquine and pregnancy on lupus flares in Korean patients with systemic lupus erythematosus

JH Koh[1], HS Ko[2], S-K Kwok[1], JH Ju[1] and S-H Park[1]
[1]Division of Rheumatology, Department of Internal Medicine, School of Medicine; and [2]Department of Obstetrics and Gynecology, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, South Korea

Retrospective analysis of 179 pregnancies in 128 SLE patients between 1998 and 2012

Predictors of lupus flare during pregnancy

	Univariate		*Multivariate*	
	Odds ratio	*95% CI*	*Odds ratio*	*95% CI*
Preexisting nephritis	3.611	1.935–6.741	3.444	1.017–11.662
Previous lupus flare during pregnancy	2.915	1.398–6.077		
Not taking HCQ	1.983	1.035–3.798	3.572	1.256–15.736
Active disease at conception	2.833	1.537–5.221		
Baseline serum uric acid	2.075	1.312–3.282	2.649	1.423–4.932
Baseline C3	0.978	0.964–0.991		
Baseline C4	0.937	0.895–0.981	0.842	0.747–0.949
Baseline estimated GFR	0.963	0.944–0.982		
Baseline proteinuria	3.804	1.472–9.834		

Lupus (2015) 24, 210–217

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Antiphospholipid antibody-positive LN patients

Medication	First pregnancy	Maternal history of venous thrombosis	Pregnancy loss(es) without treatment	Pregnancy loss(es) on A or H	Pregnancy loss(es) on A + H
No treatment	Can be used				
Corticosteroids (C)	SLE indication	SLE indication	SLE indication	SLE indication	SLE indication
Aspirin (A)	Can be used		Preferred		
Heparin (H)		Indicated	Can be used		
Iv-immunoglobulin (G)					Can be used
Combinations		(A + H)	(A + H)	A + H	A + H + G + (C)

Scand J Urol Nephrol 35: 319–327, 2001

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Follow up during pregnancy

Timing	Suggested Laboratory Tests	Comments
Preconception counseling and/or first prenatal visit	Urinalysis Determination of proteinuria	Obtain protein/creatinine ratio, optimally 24-hour urine protein
	Complete blood count Serum creatinine Antiphospholipid antibodies Anti-SSA/Ro and anti-SSB/La antibodies	If positive, conduct weekly fetal heart rate assessments from 16 to 24 weeks of gestation and every other week thereafter until 32 weeks
	Anti-double-stranded DNA antibody Complement studies Liver function tests	
Every month	Urinalysis Determination of proteinuria Serum creatinine	If these test results are abnormal, obtain lupus serologies and complement studies; consider a renal biopsy before 32 weeks of gestation
Every trimester[a]	Complete blood count Anti-double-stranded DNA antibody Complement studies Liver function tests (for patients taking azathioprine)	

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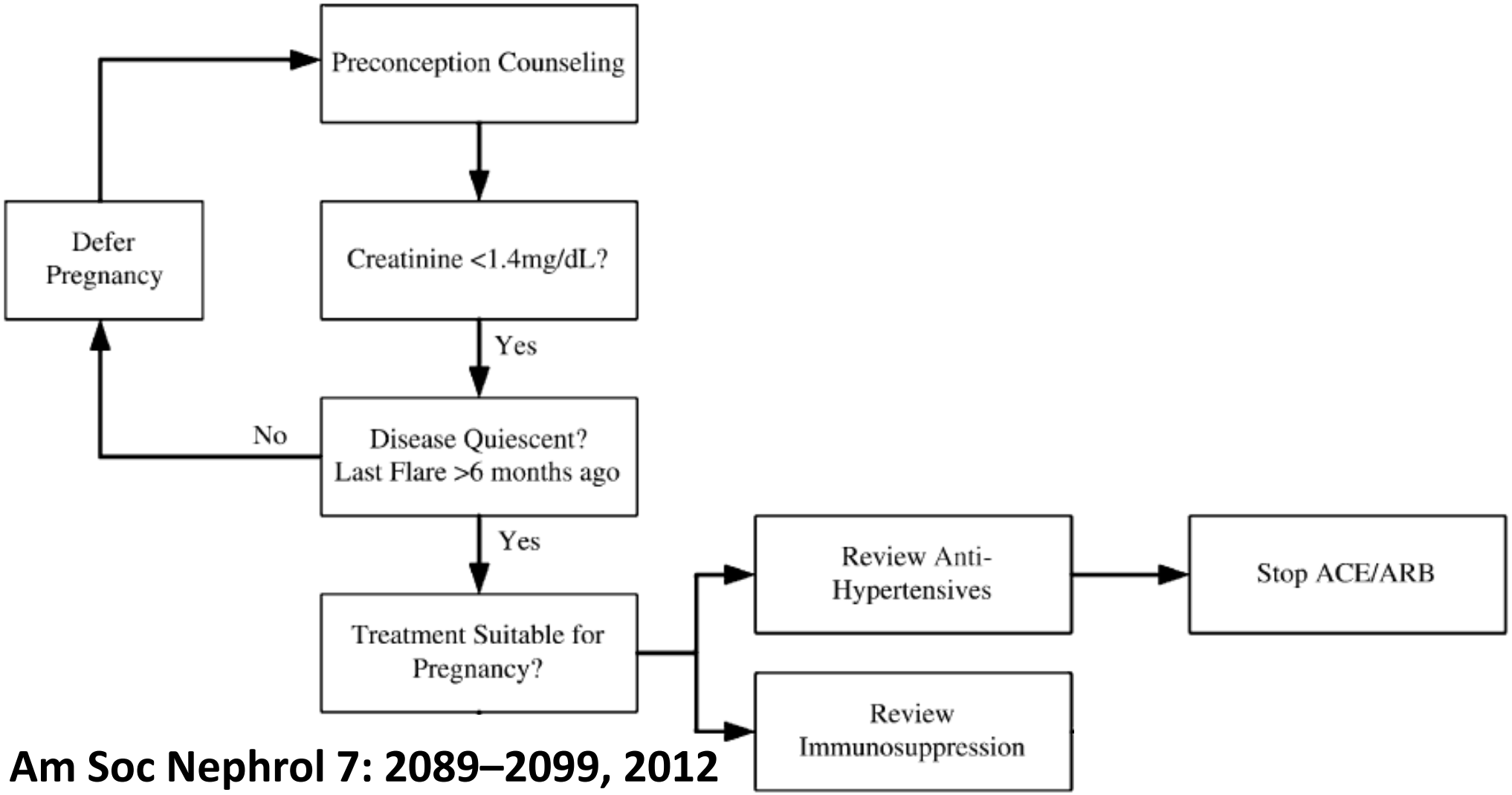
Management of lupus nephritis during pregnancy



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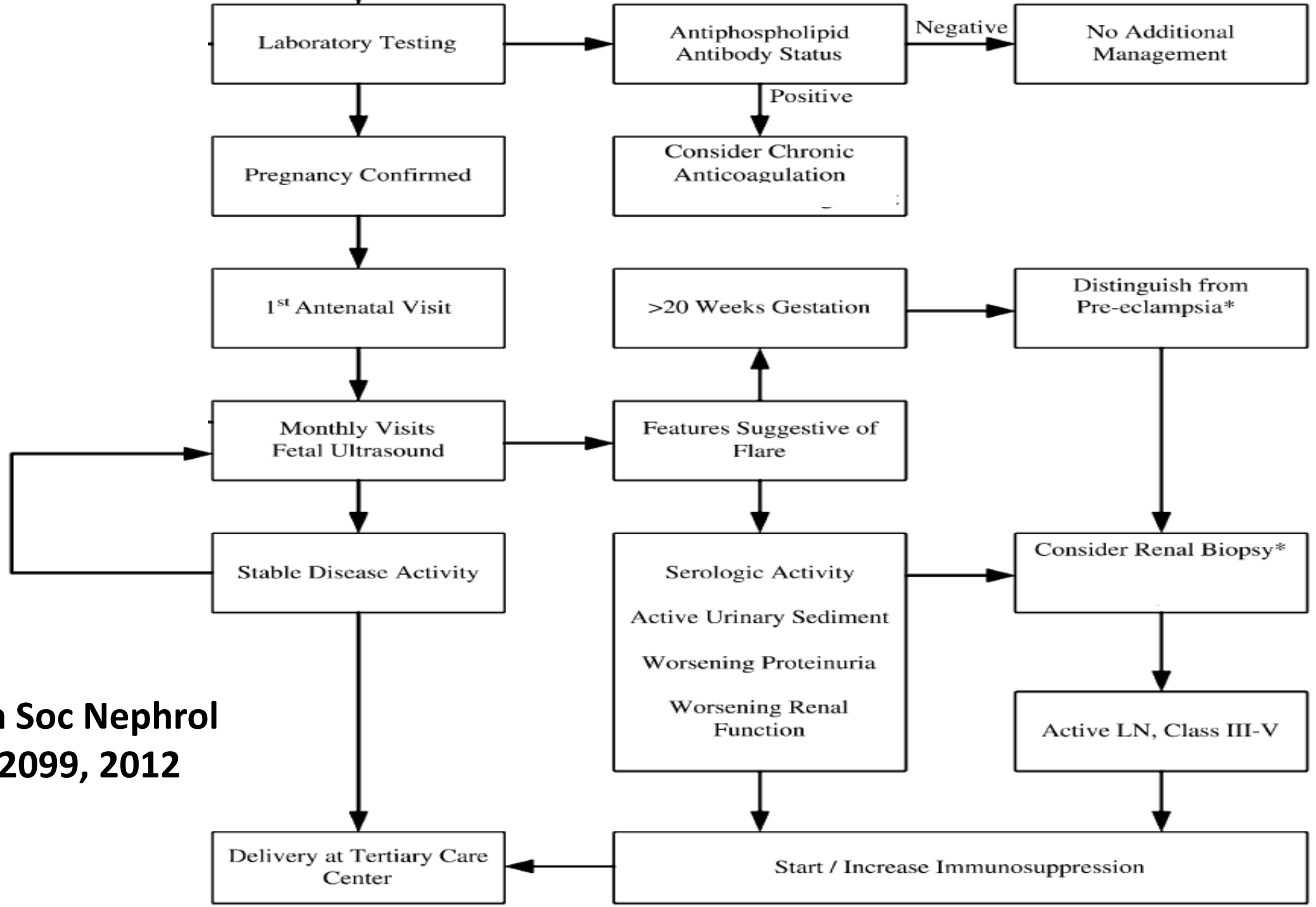

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Contraception

- Early stage of the disease
- Very active disease with severe organ involvement or damage
- Use of embryotoxic/foetotoxic drugs

Autoimmune diseases, 2015

Methods of contraception

A. Barrier (condoms and diaphragms)

- Pregnancy rate ~ 17%

B. IUD

- Infection (PID)
- Preferable to be used in patients on mild treatment (no immunosuppressive drugs, prednisone < 10 mg per day)

C. Hormonal

- PO pills
- COC pills

Autoimmune diseases, 2015

The NEW ENGLAND JOURNAL of MEDICINE

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A Trial of Contraceptive Methods in Women with Systemic Lupus Erythematosus

Jorge Sánchez-Guerrero, M.D., América G. Uribe, M.D., Luisa Jiménez-Santana, M.D., Marilú Mestanza-Peralta, M.D., Pilar Lara-Reyes, LICSW, Armando H. Seuc, Ph.D., and María-del-Carmen Cravioto, M.D.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Combined Oral Contraceptives in Women with Systemic Lupus Erythematosus

Low dose COC pills is suitable for patients with stable disease and does not increase the risk of flares


Thank
You!